

**REMARKS****Claim Status**

In response to the Restriction Requirement issued by the USPTO on December 21, 2006, Applicants, by an Amendment of March 21, 2007, elected the invention of Group II (Claims 49-75, as filed) and elected the species of FIG. 1A for the purposes of searching (Claims 49-63 and 65-67, as filed). Applicants also added, by two separate amendments, Claims 77-85 and Claim 86, of which Claims 79-84 and 86 fall into Group II and read on the elected species of FIG. 1A.

Therefore, Claims 49, 50, 52-63, 65-67 and 86 are currently pending. Claims 1-36, 38-48, 64 and 68-85 are withdrawn. Claims 37 and 51 have been previously cancelled. Claims 87 and 88, falling into the elected Group II and reading on the elected species of FIG. 1A are now added.

Applicants note that the withdrawal of Claim 64, 68-75, and 79-84 is subject to non-allowance of the linking (generic) claims, namely Claims 49. According to M.P.E.P. §§809 and 804.01, the linking claims must be examined with the invention elected, and should any linking claim be allowed, the restriction requirement must be withdrawn. Accordingly, should the elected species be found allowable in view of the traversal of the rejection of Claim 49 under 35 U.S.C. §§102 and 103(a), below, Applicants request that the Examiner examine the linking claim (Claim 49), and, if allowable, the claims to non-elected species, such as the species of Claims 64, 68-75, and 79-84.

**Claim Amendment**

Pending Claim 49 is amended to recite that the at least one aspherical reflecting surface spans an azimuthal arc of 360°. This amendment is supported throughout the specification and, in particular, by FIGs. 1 and 3, which clearly show an elliptical mirror that spans the full azimuthal arc. Further support is found in Claims 61 and 62, which recite that the “additional reflecting surface can be rotated about at least one axis to effect redirection of one of said object or reference beams through an azimuthal arc of [...] less than or equal to 360° on said ellipsoidal reflecting surface”.

Claim 50 is amended to recite that at least one *portion* of the at least one aspherical reflecting surface is an ellipsoidal reflecting surface. This amendment is supported by the disclosure on page 22, lines 1-9 of the application as filed, which teaches that “[the] aspheric mirror can be substantially ellipsoidal, with certain aspheric departures to assist in ensuring the reference beam footprint at the media plane is uniform”. In other words, an aspherical mirror employed by the apparatus defined by Claim 50, in one embodiment, comprises a portion that is substantially ellipsoidal, while other portions of the aspherical mirror are not required to be ellipsoidal.

Claims 56-62, 66 and 67 are amended to comply with the antecedent rules in view of the amendment to Claims 49 and 50.

Withdrawn Claims 1, 4, 5, 8-10, 21, 25, 27, 33, 47, 48, 64, 68-70, 72 and 75 are also amended.

Claims 1, 21, 27, 47, 48 and 72 are amended to recite that the at least one aspherical reflecting surface spans an azimuthal arc of 360°.

Claims 4, 5, 8, 9, 10, 21, 25, 27, 33, 47, 48, 68, 69, 72 and 75 are amended to comply with the antecedent basis rules in view of the amendments introduced to the to their respective base claims.

Claims 64, 69 and 70 are amended to make them dependent on Claim 49.

New Claims 87 and 88 are added. New Claim 87 is drawn to the subject matter of Claim 6. New Claim 88 is drawn to the subject matter of Claim 56.

#### Claim Rejections

Claims 49, 50, 56, 63, 65-67 and 86 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. 6,700,686 (“King”). Claims 52-55 stand rejected as being unpatentable over King in view of U.S. Pat. Pub. No. 2003/0053232 (“Dalziel”). Claims 57-62 stand rejected under 35 U.S.C. §103(a) as being unpatentable over King in view of U.S. 5,566,387 (“Dewald”).

Applicants amended base Claim 49 to recite that the at least one aspherical reflecting surface spans an azimuthal arc of 360°. Applicants submit that an apparatus defined by Claim 49 as amended is neither described nor suggested in the references of record.

*Rejection Under 35 U.S.C. §102(e) over King*

Claim 49, as amended, and claims dependent thereon are novel over King. Inspection of FIG. 1 and the corresponding description in columns 5-7 of King, indicates that mirror 135 of King's FIG. 1 (or mirror 288 of King's FIG. 2) are described specifically as elliptical mirrors (column 5, line 16 and column 6, line 56). There is no description or suggestion that these mirror can be an aspherical reflecting surface comprising a portion that is substantially ellipsoidal, while other portions of the aspherical mirror are not required to be ellipsoidal, as described by Applicants on page 22, lines 1-9 of the instant application. Such a design, however, provides important advantages, described by Applicants:

Such aspheric mirror can be substantially ellipsoidal, with certain aspheric departures to assist in ensuring the reference beam footprint at the media plane is uniform. Changing the conic constant of an ellipsoid provides a means to change the magnification of the galvanometer-controlled angle to the angle at the holographic media. Consequently, such a design can provide for the large interbeam angles that are required for high-capacity holographic storage (e.g.,  $\theta = 60^\circ$ ) with relatively little optical deflection of the reference beam at the galvanometer-controlled mirror (e.g.,  $\alpha = 8^\circ$ ).

Neither this design of an aspherical mirror, nor the advantages associated with such a design are taught or appreciated in King.

Moreover, the elliptical reflecting surface of King does *not* span an azimuthal arc of  $360^\circ$ . Further, in their review of King, Applicants were unable to find any suggestion to extend mirror 135 (King, FIG. 1) or 288 (King, FIG. 2) to span the full circular arc of  $360^\circ$ . Nor does King describe any advantage for doing so, and does not describe or suggest that more azimuthal angles for multiplexing can be achieved or utilized, with or without combining with planar-angle multiplexing angles, without cross talk by implementing a spanning of  $360^\circ$ .

Thus, the device defined by Applicants' Claim 49 possesses advantages over King's device. The aspherical reflecting surface can ensure that the reference beam footprint at the media is uniform and permits to change the magnification of the galvanometer-controlled angle to the angle at the holographic media. By virtue of having more azimuthal angles available for the same value of the planar angle, Applicants' device can be used to record *more* azimuthally multiplexed holograms at the same storage location on the recording media.

In view of the foregoing, Claim 49 and claims dependent thereon are novel and non-obvious over King. Reconsideration and withdrawal of the rejection are respectfully requested.

*Rejection Under 35 U.S.C. §103(a)*

In rejecting dependent Claims 52-55 and, separately, dependent Claims 57-62, the Examiner relied on Dalziel and Dewald. The Examiner relies on Dalziel for its teachings of a galvanometer device. The Examiner relies on Dewald for its teachings of angle-multiplexed holography.

Applicants addressed both Dalziel and Dewald in the Amendment filed September 20, 2007.

As Applicants previously explained, Dalziel is devoid of any reference to holography, much less to a combination of azimuthal and plane angle multiplexing. Dalziel describes a two-dimensional galvanometer that "uses the Z-stop mechanism to substantially confine the movement of the mirror or the mirror assembly to rotation around one or more rotational axes without any significant translational movement". See Dalziel, [0023], FIG. 1, and [0024]. Dalziel does not provide motivation to modify a holographic recording/reading device of King to include an elliptical mirror that spans a full azimuthal arc of 360°.

As Applicants also previously explained, Dewald discloses an apparatus for recording/reading holographically stored information in which holograms may be planar angle multiplexed. See Dewald, brief description of FIG. 5 and column 11, lines 8-12. Planar angle multiplexing is accomplished by rotating mirror 70 shown in FIG. 2 around a single axis that is perpendicular to the plane of the drawing and by reflecting the light beams off of aspherical mirror 76. See Dewald, column 6, line 5. As a consequence, Dewald's device is used solely for planar angle multiplexing. Dewald is devoid of teachings or suggestion of azimuthal multiplexing, and, therefore, of a combination of azimuthal and planar multiplexing. Dewald fails to disclose that either mirror 70 or mirror 76 of Dewald's FIG. 2 can rotate around two axes, a feature that permits combined multiplexing. Because Dewald does not teach azimuthal multiplexing, Dewald's aspherical mirror 76 spans only a fraction of an azimuthal arc. Thus, Dewald does not provide motivation to modify the device of King to include an elliptical mirror that spans a full azimuthal arc of 360°.

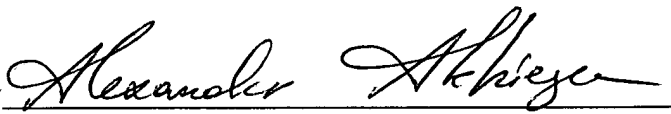
In view of the foregoing, Claim 49 and claims dependent thereon are non-obvious over the combination of King, Dalziel and Dewald. Reconsideration and withdrawal of the rejections are respectfully requested.

**CONCLUSION**

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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